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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Examiner: Phillip A. Johnson
MICHAEL SASGES	Group Art Unit: 2881
Application No.: 09/846,682	
Filed: May 2, 2001	
For: OPTICAL SENSING AND CONTROL OF ULTRAVIOLET FLUID TREATMENT DYNAMICS	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF INVENTOR UNDER 37 C.F.R. §1.131

I, Michael Sasges, having a post office address at 1711 Mortimer St., Victoria BC Canada V8P 3A9, hereby declare and say as follows:

1. I am the sole inventor of the subject matter disclosed and claimed in independent Claims 1, 7 and 15 of the above-identified United States patent application. In preparing this Declaration, I have reviewed the following documents:

- the above-identified United States patent application
- the Official Action dated March 12, 2003;
- United States patent 6,057,917 [Petersen et al. (Petersen)] and
- the Response being submitted concurrently herewith.

2. I conceived the subject matter of at least independent Claims 1, 7 and 15 prior to the February 26, 1999 priority date of Petersen. Furthermore, I acted to diligently reduce to practice the subject matter of the invention recited in independent Claims 1, 7 and 15, from the conception thereof up to at least February 26, 1999, in NAFTA member country Canada. Moreover, from a date prior to February 26, 1999, I diligently continued to work to refine the subject matter of the invention recited in independent Claims 1, 7 and 15, and I aver that a constructive reduction to practice of that subject matter occurred at least as of the filing of United States Patent Application No. 09/846,682 on May 2, 2001.

3. Enclosed as Exhibit 1 is a copy of an excerpt from my laboratory notebook illustrating a sensor having a silicon carbide (SiC) photodiode. Also enclosed as Exhibits 2 and 3 are copies of drawings illustrating the major components (sensor pre-assembly in Exhibit 2 and port probe in Exhibit 3) of a sensor assembly for use in an ultraviolet light fluid sterilizing apparatus sold by Trojan Technologies Inc. under the tradename System UV8000™ (see title block of the drawings in Exhibits 2 and 3). Also enclosed herewith as Exhibit 4 is an internal presentation extolling the use of a silicon carbide photodiode in place of an "existing photodiode" in a radiation sensor. Also enclosed herewith as Exhibit 5 is a brochure (© 1998) illustrating the ultraviolet light fluid sterilizing apparatus sold by Trojan Technologies Inc. under the tradename System UV8000™ – page 5 of Exhibit 5 describes sensor (incorporating the "existing photodiode") used to monitor ultraviolet radiation intensity.

4. I aver that, prior to February 26, 1999, I conceived of using a silicon carbide photodiode (Exhibits 1 and 4) in a sensor assembly (Exhibits 2 and 3) for an ultraviolet light fluid sterilizing apparatus such as the one sold by Trojan Technologies Inc. under the tradename System UV8000™ (Exhibit 5). I aver that each document of Exhibits 1-

5 was created prior to February 26, 1999 and that I personally created the documents of Exhibits 1 and 4 prior to February 26, 1999. I aver that the documents of Exhibits 1-5 also provide evidence that the invention was being diligently reduced to practice from the conception thereof up to at least February 26, 1999.

5. Enclosed as Exhibit 6 is a copy of experimental data showing continued development of the invention recited in independent Claims 1, 7 and 15. This data was generated from field experiments which evidence that, during the period from a date prior to February 26, 1999 up until the filing of United States Patent Application No. 09/846,682 on May 2, 2001, I (and others under my direction at Trojan Technologies Inc.) diligently continued to work to refine the subject matter of the invention recited in Claims 1, 7 and 15. I aver that a constructive reduction to practice of that subject matter occurred at least as of May 2, 2001.

6. The combination of Exhibits 1-5 show an invention directed to an ultraviolet light fluid sterilizing apparatus including: at least one ultraviolet light source configured to irradiate a fluid with ultraviolet light to sterilize the fluid; an ultraviolet light sensitive silicon carbide photodiode, said photodiode capable of generating a signal proportional to the intensity of ultraviolet light detected by said photodiode; and a sealed outer housing comprising an optically transparent window, said silicon carbide photodiode located inside said housing and adjacent said transparent window (see Claim 1).

7. The combination of Exhibits 1-5 show an invention directed to ultraviolet light fluid sterilization apparatus including: a fluid chamber; at least one ultraviolet light source configured to emit ultraviolet light into said fluid chamber; and at least one ultraviolet light sensor comprising a silicon carbide photodiode (see Claim 7).

8. The combination of Exhibits 1-5 shows an invention directed to a method of sterilizing a fluid utilizing an ultraviolet light fluid sterilization apparatus, the sterilization apparatus including a fluid chamber, at least one ultraviolet light source, and at least one ultraviolet light sensor, each ultraviolet light source configured to emit ultraviolet light into the fluid chamber, and each ultraviolet light sensor comprising a silicon carbide photodiode, said method including the steps of: flowing a fluid into the chamber of the ultraviolet light sterilization apparatus; irradiating the fluid with ultraviolet light from the at least one ultraviolet light source of the sterilization apparatus; measuring the intensity of the ultraviolet light in the fluid chamber with the ultraviolet light sensor; sensing an output signal from the ultraviolet light sensor with the controller; and adjusting the level of ultraviolet light intensity in the chamber with an output signal from the controller to the light source (see Claim 15).

9. Therefore, it is evident that United States Patent Application No. 09/846,682 (filed on May 2, 2001) claims an invention that was conceived of prior to February 26, 1999 and was diligently reduced to practice during the period from a date prior to February 26, 1999 up until the filing of United States Patent Application No. 09/846,682 on May 2, 2001.

10. I hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such wilful false statements may jeopardize the validity of the application or any patent issued thereon.

Declared and signed at Victoria, British Columbia, Canada.

Michael Sasges

9 SEP 2003

September 9, 2003

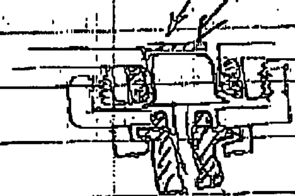
Vi tor Yen

1/4 x 1/4 + diffuser

~ $15 - 20

diffuser

SiC diode w/ amplifier
Hermetically sealed



for 3000 5000

Rubber Grommet / strain relief

Output 0-5V over to
Amplifier to 4-20mA

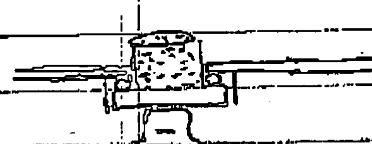
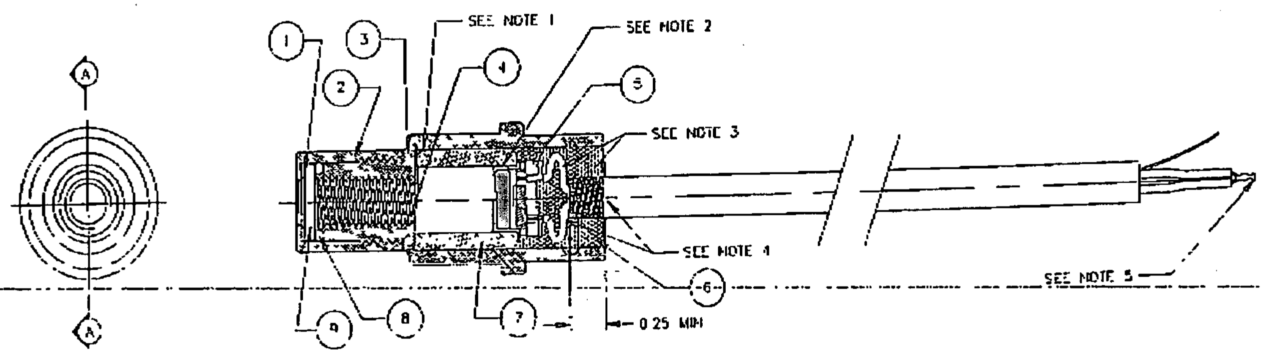


EXHIBIT 1

REV	REVISION DESCRIPTION	LOG NO	REV BY	CH. BY	APPROVAL AND DATE
A	DRAWING RELEASED		CB		



SECTION A-A

NOTES.

1 THE DIODE SPACER MUST BOTTOM-OUT INTO THE PROBE BODY.
2 UV DIODE MUST BE PRESSED SNUGLY AND FULLY INTO THE DIODE SPACER.
3 MAINTAIN EQUAL LENGTHS OF EXPOSED INSULATED WIRES
4. NO PORTION OF CABLE SHIELD OR DRAIN WIRE MAY CONTACT INSIDE SURFACE OF PROBE BODY
5. APPLY PRIMER TO EXPOSED INSULATED WIRES AND END OF PVC JACKET.
6 THE BARE LEADS ON THE CABLE MUST BE TIED TOGETHER AT ALL TIMES.
7. ALL PARTS MUST BE FREE FROM ANY RESIDUES AND OTHER CONTAMINANTS.
8. VITROSIL WINDOW MUST BE THE FIRST PART TO BE ASSEMBLED WITH THE TEFLON WASHER AND O-RING INTO THE PROBE ENDCAP. THEN SCREW THE PROBE BODY INTO THE ENDCAP. FINGER TIGHTEN CAREFULLY SO THAT THE QUARTZ WINDOW DOES NOT BREAK.
9. THE INSIDE OF THE PROBE BODY MUST BE PURGED WITH DRY AIR OR NITROGEN GAS BEFORE ASSEMBLING THE OTHER COMPONENTS.
10. USING LABORATORY-QUALITY COTTON SWAB, APPLY THIN LAYER OF PLASTIC PRIMER ON INTERIOR EXPOSED INSULATED WIRES AND PVC CORD JACKET.
11. FILL THE POTTING COMPOUND WITH AT LEAST 3 PASSES. ON THE FIRST FILLING, THE JACKET OF THE CABLE MUST BE INSERTED AT LEAST 1/4" INTO THE PROBE BODY. THE CABLE MUST BE INSERTED IN THE CENTRE OF THE 1/2" HOLE ± 1/16". THE EPOXY REQUIRES A CURING TIME OF AT LEAST 24 HOURS AT 65-70°C.

ITEM	QTY	ITEM DESCRIPTION	PART NUMBER	DOCUMENT NUMBER
9	1	WINDOW VITROSIL	015012	015012
8	1	O-RING 7mm/10mm 1.5mm EPDM	015030	---
7	1	SPACER, UV DIODE	[illegible]	015013
6	--	3M POTTING EPOXY #270	---	---
5	1	UV DIODE C/W FILTER PRE-WIRE	015151	015151
4	1	APERTURE, UV PROBE	015014	015014
3	1	PROBE BODY, UV700 GEN.2	015028	015026
2	1	ENDCAP, PROBE	015029	015029
1	1	WASHER TEFLON .385x.252x.020	015027	---

UNLESS OTHERWISE SPECIFIED:

TROJAN TECHNOLOGIES INC.

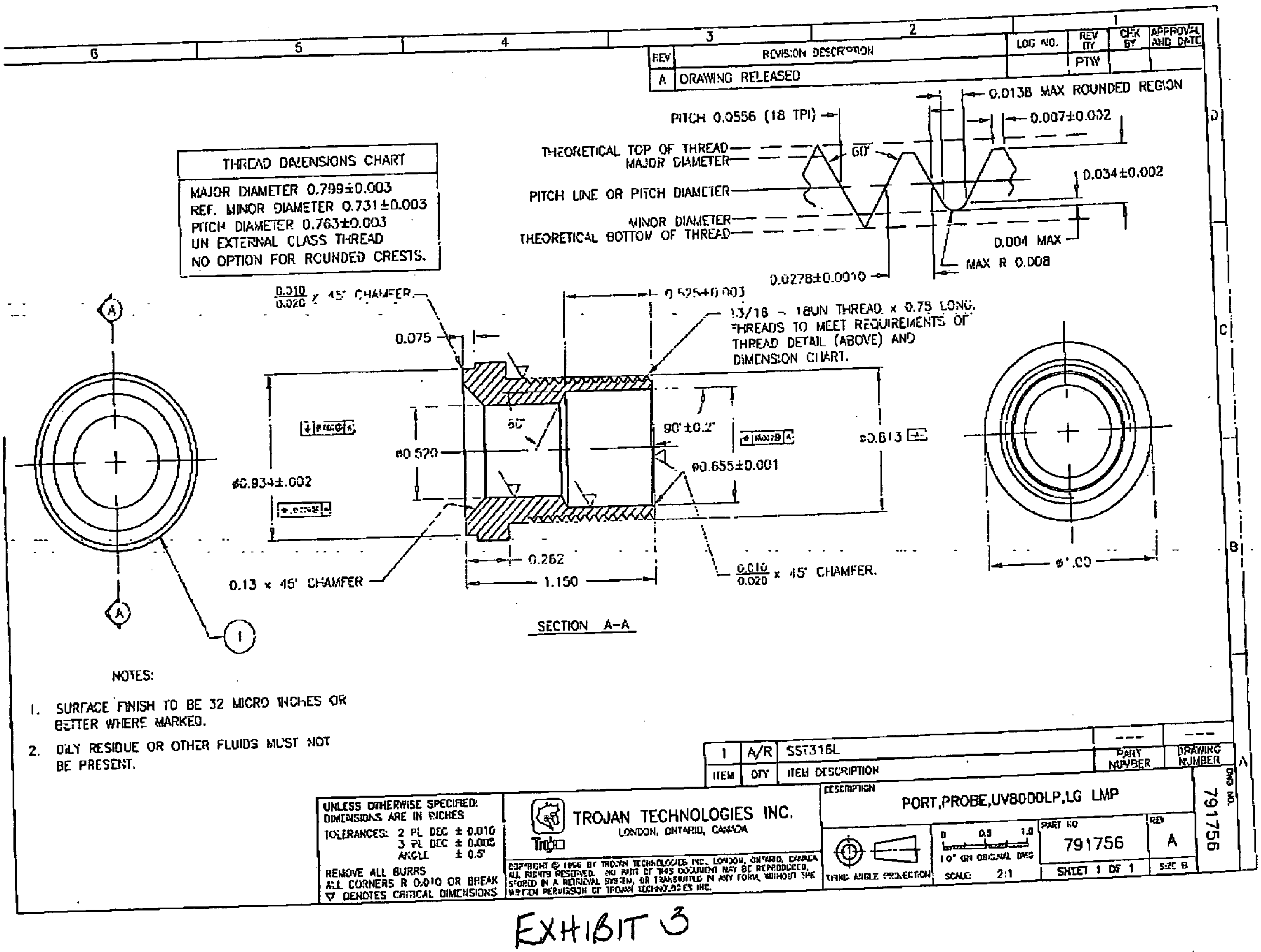
SENSOR PRE-ASSY, UV8000LP

015152 A

SHEET 1 OF 1

015152

EXHIBIT 2


REV | REVISION DESCRIPTION | LOG NO. | REV BY | CHK BY | APPROVAL AND DATE
A | DRAWING RELEASED | | PTW
PITCH 0.0556 (18 TPI)
0.0138 MAX ROUNDED REGION
0.007±0.002
60°
THEORETICAL TOP OF THREAD
MAJOR DIAMETER
PITCH LINE OR PITCH DIAMETER
MINOR DIAMETER
THEORETICAL BOTTOM OF THREAD
0.034±0.002
0.004 MAX
MAX R 0.008
0.0278±0.0010
THREAD DIMENSIONS CHART
MAJOR DIAMETER 0.799±0.003
REF. MINOR DIAMETER 0.731±0.003
PITCH DIAMETER 0.763±0.003
UN EXTERNAL CLASS THREAD
NO OPTION FOR ROUNDED CRESTS.
0.010/0.020 x 45° CHAMFER
0.075
0.525±0.003
13/16 - 18UN THREAD x 0.75 LONG. THREADS TO MEET REQUIREMENTS OF THREAD DETAIL (ABOVE) AND DIMENSION CHART.
60°
90°±0.2°
ø0.520
ø0.655±0.001
ø0.934±.002
ø0.813
0.262
1.150
0.13 x 45° CHAMFER
0.010/0.020 x 45° CHAMFER.
ø1.00
SECTION A-A
NOTES:
1. SURFACE FINISH TO BE 32 MICRO INCHES OR BETTER WHERE MARKED.
2. OILY RESIDUE OR OTHER FLUIDS MUST NOT BE PRESENT.
1 | A/R | SST316L
ITEM | QTY | ITEM DESCRIPTION | PART NUMBER | DRAWING NUMBER
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES
TOLERANCES: 2 PL DEC ± 0.010
3 PL DEC ± 0.005
ANGLE ± 0.5°
REMOVE ALL BURRS
ALL CORNERS R 0.010 OR BREAK
▽ DENOTES CRITICAL DIMENSIONS
TROJAN TECHNOLOGIES INC.
LONDON, ONTARIO, CANADA
DESCRIPTION
PORT,PROBE,UV8000LP,LG LMP
THIRD ANGLE PROJECTION
10" ON ORIGINAL DWG
SCALE 2:1
PART NO 791756
REV A
SHEET 1 OF 1
SIZE B
DWG NO. 791756
EXHIBIT 3

Project Details Optics

- Goals:
  1. ±10% deviation within 60 degree acceptance angle
  2. Design optical path for maximum flexibility
  3. Change from Radiance to Irradiance measurements
  4. Investigate SiC photodiodes
- Resources:
  - 2 people 4 months, $80,000 (1 person additional)

Trojan Technologies Inc.

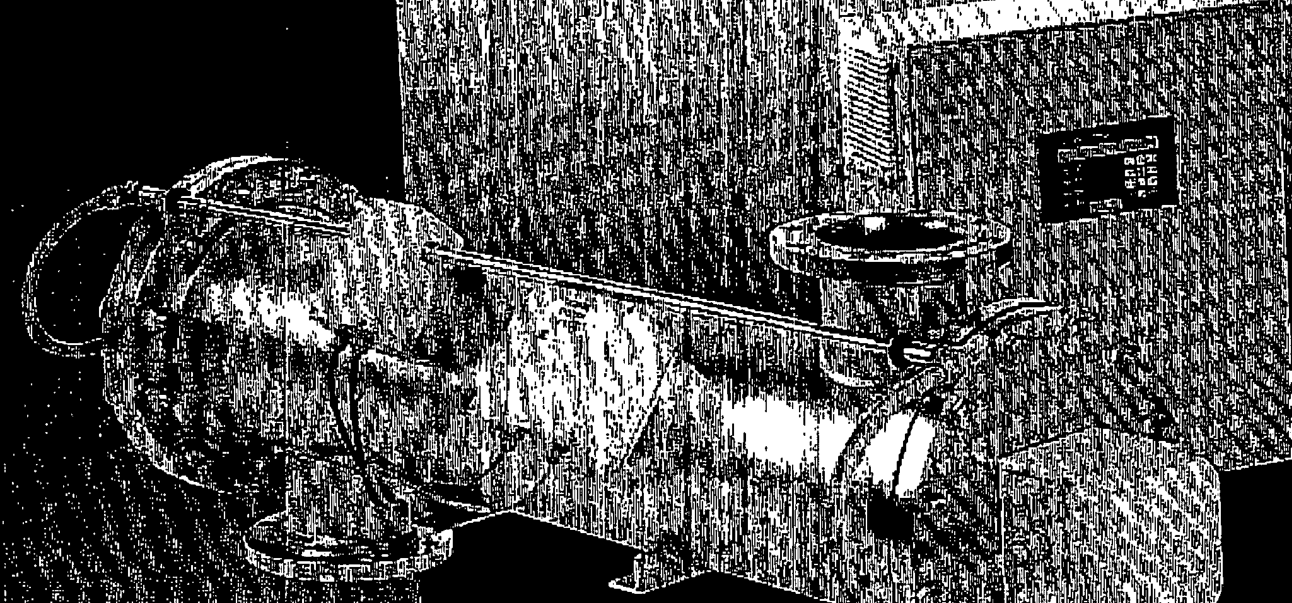
EXHIBIT 4

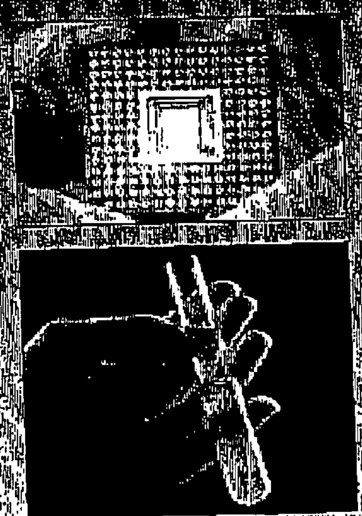
SiC Benefits

- Sensitive only between 200 and 400nm
  Same responsivity as existing photodiode
- "High radiation hardness"
  Available with UVC filter, diffuser, pre-amp
- Usable up to 350° C. Varies 3% over 75°
- Cost of SiC diode: < $24 ea.
- Cost of existing LP diode: $17
- Cost of existing MP diode: $105

Trojan Technologies Inc.

TROJAN SYSTEM UV8000





Ultrapure Water Ultraviolet Systems

Trojan Technologies Inc.

Exhibit 5

REVOLUTIONARY UV TECHNOLOGY FOR ULTRAPURE WATER

Evolution of UV Light Technology

For over 60 years, ultraviolet (UV) light has been used as a practical and cost-effective method to disinfect many types of liquids.

More recently, UV technology has also been used to destroy residual ozone in the pharmaceutical and beverage industries, where ozone is often utilized to disinfect and oxidize trace organics. Residual ozone is destroyed because it negatively impacts the quality of finished products.

UV lamps emitting light energy in the wavelength regions lower than 220 nm have been found to be effective in reducing total organic carbon (TOC) levels in water and are used extensively in ultrapure water treatment for the semi-conductor industry. Reduction of trace organic levels in ultrapure water is critical to product yield and overall water treatment system performance.

Applying UV Energy in Liquid Applications

Specific amounts of UV energy (applied UV dose) are required to effectively destroy micro-organisms, break apart TOC compounds or eliminate ozone residuals.

Applied UV dose is measured as the product of UV light intensity times the exposure time within the UV lamp array.

(A) Disinfection

Micro-organisms vary in their sensitivity to UV energy. Lethal doses for various micro-organisms are known and well documented, as shown in the chart below.

Many of these organisms are destroyed with minimal amounts of UV energy (in most cases, less than 20,000 µwatt-s/cm²). All Trojan UV8000 low and medium pressure lamp UV systems are designed to provide UV doses in excess of 30,000 µwatt-s/cm² at the end of lamp life to ensure minimum reductions of 99.9%.

(B) Ozone Destruction

Reduction of residual ozone is accomplished at the UV wavelength of 253.7 nanometers (nm). Ozone, when exposed to UV light, reaches an excited state more rapidly and is consumed to leave only the oxygen molecule dissolved in the water. Effective dissociation of up to 1 part per million (ppm) of residual ozone can be achieved with an applied UV dose of 90,000 µwatt-s/cm².

Ultraviolet Dose Required for 99.9% Inactivation of Various Micro-organisms (µwatt-s/cm²)*

Bacteria	UV Dose
Bacillus anthracis	3,500
Bacillus megatherium (veg.)	9,600
Bacillus megatherium (spore)	8,100
Bacillus subtilis (mixed veg. & spore)	8,300
Clostridium tetani	86,000
Corynebacterium diptheriae	10,200
Eberthella typhosa	6,300
Escherichia Coli.	9,600
Leptospira	10,200
Micrococcus candidus	18,000
Micrococcus radiodurans	61,500
Micrococcus sphaeroides	30,000
Mycobacterium tuberculosis	17,400
Neisseria catarrhalis	13,200
Phytomonas tumefaciens	13,200
Proteus vulgaris	7,800
Pseudomonas aerugenosa	16,500
Pseudomonas flourescens	10,500
Salmonella	16,200
Salmonella enteritidis	12,000
Salmonella paratyphi	9,600
Salmonella typhi	6,300
Sarcina lutea	59,100
Serratia marcescens	7,200
Shigella dysenteriae	6,800
Shigella flexneri	5,100
Shigella paradysenteriae	5,500
Spirillum rubsum	13,200
Staphlococcus albus	9,900
Staphlococcus aureus	15,000
Streptococcus hemolyticus	16,600
Streptococcus lactis	18,600
Streptococcus pyogenes	6,600
Streptococcus viridans	6,000
Vibrio comma	7,200
	[illegible]

Virus	UV Dose
Adenovirus Type 3	7,400
Bacteriophage	10,800
Coxsackie AZ	9,500
Hepatitis A	21,900
Influenza virus	10,800
Poliovirus	9,600
Rotavirus	26,500
Tobacco Mosaic virus	720,000
Yeast	
Baker's yeast	14,400
Brewer's yeast	11,700
Common yeast Cake	21,900
Saccharomyces cerevisiae	21,900
Saccharomyces ellipsoides	21,900
Saccharomyces sp.	29,100
Mould Spores	
Aspergillus flavus	171,000
Aspergillus glaucus	198,000
Aspergillus niger	468,000
Oospora Lactis	17,900
Penicillium digitatum	138,000
Penicillium expansum	39,000
Penicillium roqueforti	43,600
Protozoa	
Chlorella Vulgaris	34,700
Nematode eggs	147,000
Paramecium	315,000

*This table indicates the dose (microwatt seconds/square centimetre) of UV required for a 3 log reduction of various microbes. The doses have been calculated from 1 log reduction values obtained from several sources as reported by various authors. Any variations in the UV doses displayed compared to other published data may result from different experimental approaches, calibration procedures, etc.

(C) TOC Reduction

Total organic carbon (TOC) reduction with UV energy is more complex than inactivation of microbes or destruction of residual ozone. There are different mechanisms at work, dependent on the type of UV lamp used.

Where 185 nm low pressure UV lamp systems are used, the working mechanism is the direct photolysis of water. This process creates powerful hydroxyl (OH^-) radicals that attack organic compounds and break them into acid-based groups which can readily be absorbed by ion exchange systems. If complete oxidation occurs, CO_2 and H_2O are the final products. This mechanism functions in a thin water layer due to the poor transmission of short wavelengths in water.

Where broad spectrum medium pressure UV lamp systems are used, two mechanisms are at work. The lower wavelength emissions (below 220 nm), create hydroxyl radicals. Direct photolysis of the organic contaminants also occurs as a result of the longer wavelengths emitted by the medium pressure UV lamp. These longer wavelengths can be effective for organic compounds that have a UV absorption maximum higher than 220 nm. Since longer wavelengths are more readily transmitted, this second mechanism will function well at distances from the lamp which are greater than those used for the direct photolysis of water. In this regard, the medium pressure lamp is often considered to be a better choice for this unit operation in a high purity water application.

Generally, high applied UV doses are required to break apart organic bonds. UV doses start as low as 90,000 µwatt-s/cm² and can exceed 300,000 µwatt-s/cm² depending on the type and level of organic to be treated. In order to assess your requirements, contact Trojan for assistance in designing the appropriate UV system for your TOC reduction application.

Trojan: The Company and its UV Technology Philosophy

Trojan Technologies Inc. has worked diligently to provide sound UV technology to our valued customers for over 20 years. Industries have trusted our designs for quality, reliability and consistent performance. Our fully equipped research facilities, complete with microbiological and chemical laboratories, have developed scientifically based UV technology solutions which exceed today's requirements and discover tomorrow's opportunities.

Our engineering staff create the most cost-effective designs through sound engineering practices, based on scientific research and high-quality standards.

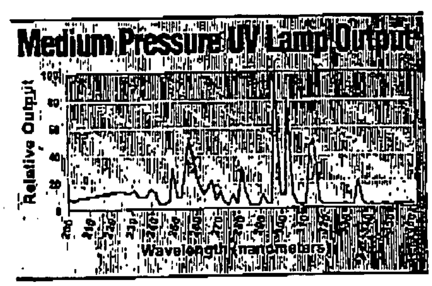
To complement our research and engineering activities, Trojan's sales and marketing team provides consistent customer contact and after-sales service second to none. Our three strategic warehouse and office locations, along with a committed distributor network, provide efficient and timely service to a growing global market. Replacement parts and technical services are only a telephone call away.

Your UV needs are our first priority.

UV Lamps

All Trojan UV lamps are manufactured and quality inspected to our engineered specifications. Trojan specifies to its lamp suppliers the materials, dimensions, electrical and UV output qualities that are acceptable for use in its UV systems.

Trojan low pressure UV lamps have output peaks at either 253.7 nm for disinfection and ozone destruction capabilities or 185 nm for the reduction of TOC in high purity waters. Trojan medium pressure UV lamps emit a broad spectral output, in the range of 200-400 nm, with peaks of energy fine-tuned for maximum output efficiency so that disinfection, ozone destruction and TOC reduction can be obtained with one lamp.



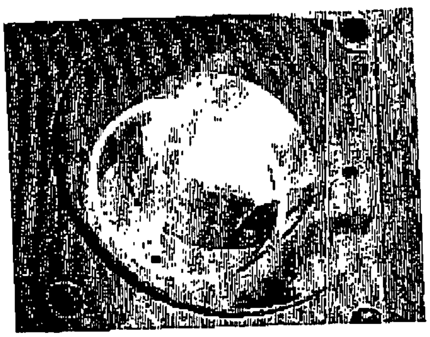
All Trojan UV lamps have uniquely designed, single ended electrical connections complete with a dielectric barrier between pins to ensure a high degree of electrical integrity and safety.

The single ended lamp design allows many Trojan UV systems to be serviced from one end of the installed vessel, at working height. Eliminating half the electrical and water sealing connections reduces the required maintenance time compared to most other manufactured UV systems.

TROJAN SYSTEM UV8000™

Quartz Sleeves

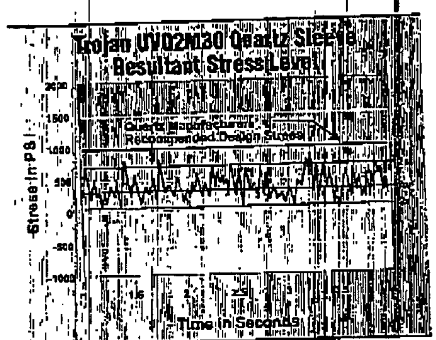
All UV lamps in Trojan systems are protected by fused quartz sleeves, designed to allow maximum emission (greater than 95%) of the available UV energy from the lamps.



UV8000™ strain tested quartz sleeve

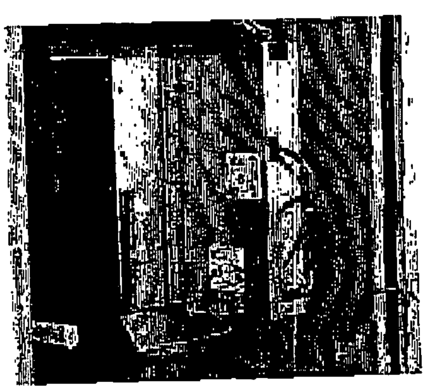
Trojan medium pressure UV lamp systems utilize strain tested quartz sleeves, available in natural or ozone free materials. Natural quartz materials are used in non-critical areas of the ultrapure water system. Ozone free quartz is used in critical disinfection locations such as semiconductor polish loops to prevent the oxidation wavelengths from passing into the ultrapure water. The use of ozone free quartz in these critical areas reduces the potential for oxidation of trace organics present, which ensures the resistivity of the water does not fall below acceptable values.

The strain testing, conducted by an independent testing laboratory, has concluded that the quartz sleeve materials used in Trojan medium pressure lamp UV8000 systems possess a high degree of strength. Our designs can tolerate higher flowrates without the threat of breakage due to hydraulic stresses imparted by flow patterns into and through our medium pressure UV systems.



Power Supplies

In maintaining our commitment to developing leading edge UV technologies, Trojan scientists and engineers have developed more efficient electronic power supplies. These electronic ballasts provide stable UV lamp input power resulting in elevated levels of UV energy from the lamps within our low pressure lamp UV8000 systems. Trojan systems provide higher applied UV doses when compared to other similar sized systems in the market. Use of such highly efficient electronic ballasts also reduces requirements for cooling in control panels.



Space-saving, efficient System UV8000™ variable input electronic ballast

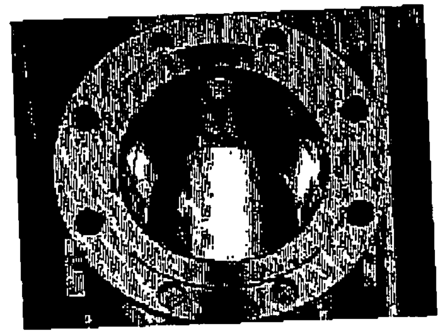
Trojan has also pioneered the development of a notebook computer sized electronic power supply for its medium pressure lamp UV8000 systems. Cumbersome panels and heavy, outdated transformer/capacitor technology are replaced by a fully variable input, high frequency power supply found only in Trojan medium pressure lamp UV8000 systems. A significant advancement in this electronic power supply is its ability to automatically increase or decrease the UV output from the lamp according to conditions of lamp age or flow, in any specific application.

TROJAN SYSTEM UV8000™

UV Reactor Chambers

UV8000 reactors are full penetration welded using 316L stainless steel. Welding is followed by pickling, passivation, mechanical and electro-polishing processes to ensure internally smooth micro-inched, sanitary finishes. After final assembly, all UV8000 systems are integrity checked and hydrostatically tested.

Clean room manufacturing facilities ensure the quality of these UV products from our plant to your door.



316L reactor chamber finished to 15 Ra.

Control Panels & Electronic Circuitry

Trojan's understanding of installation limitations has led to flexibility in system designs. All UV8000 system control panels are mountable in remote locations and possess the latest in electronic circuitry and monitoring features. All panels come with a lockable front door, operator interface display, and electrical disconnect switch. The electrical systems are designed to UL standards and conform to CE directives.

On all low pressure lamp UV8000 systems, local, standard displays allow the operator to visibly view lamp operational status, total elapsed operating time and an optional UV intensity measurement at the system panel.

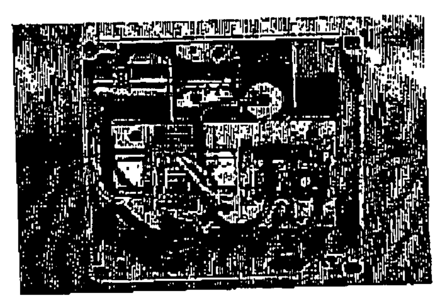
UV8000 medium pressure UV lamp systems are furnished with a microprocessor based control system. The microprocessor can be configured to provide specific control functions which permits the operation of the unit under such defined conditions as flowrate and UV dose delivery requirements. Individual units can also be tied to a central control system which can remotely monitor the UV system for status updates, alarm indication and redundant equipment availability.

These standard features ensure the integrity required for reliable operation of your UV8000 system. Remote indication of alarm conditions can be obtained from a set of dry contacts on the circuitry of the UV8000 systems.

UV Intensity Monitoring

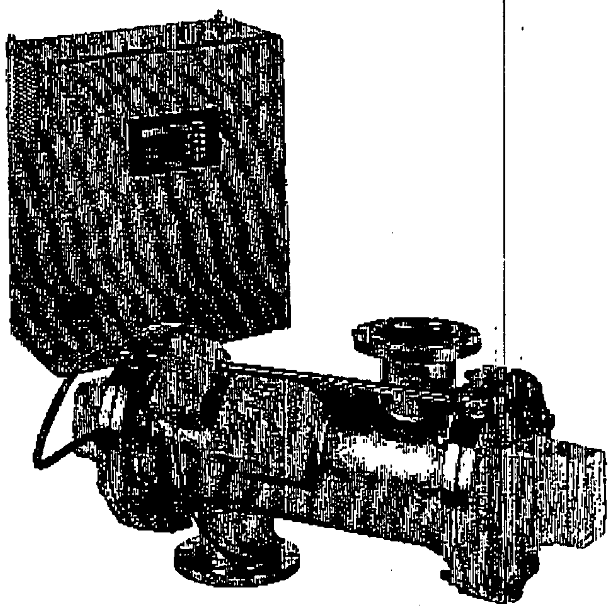
All Trojan low pressure lamp UV8000 systems can be equipped with a discrete UV intensity monitoring system which measures only UV energy emissions. The percent relative intensity is displayed on the control panel. All UV intensity and low UV alarm set-points are pre-set at the factory to provide proper indication of UV output during UV system operation and an alarm for times when inadequate levels of UV energy are being detected.

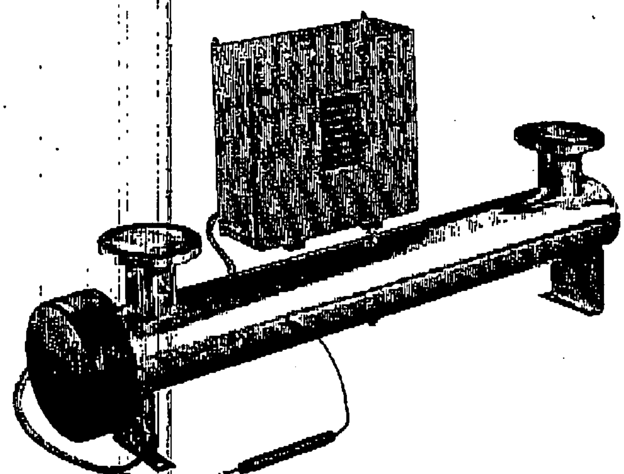
Medium pressure UV lamps emit the equivalent UV energy level of up to 16 low pressure UV lamps. As a result, UV intensity sensors must, from time to time, be recalibrated or replaced. In order to increase the life of the intensity sensor, Trojan has designed its sensor to obtain full UV intensity readings through a mechanical shutter on a timed exposure basis. The frequency of the shutter activation is configured into the system controls when the medium pressure UV8000 system is installed. All UV8000 systems have a 4-20 mA signal for continuous remote monitoring of the relative UV intensity.



Medium pressure UV intensity monitor

TROJAN SYSTEM UV8000™





UV8000 Medium Pressure UV Lamp Systems

Trojan Model No.	Number of UV Lamps	Disinfection* Flowrate	TOC Reduction** Flowrate
UV01M20	[illegible]	500 GPM	165 GPM
UV01M30	[illegible]	1000 GPM	325 GPM
UV02M30	2	2000 GPM	650 GPM

* Based on a minimum UV transmission of 98% and a UV dose of 30,000 microwatt seconds/square centimetre being delivered at the end of lamp life (5,000 hours).
** Based on a minimum UV transmission of 98% and a UV dose of 90,000 microwatt seconds/square centimetre being delivered at the end of lamp life (5,000 hours).

UV8000 Low Pressure UV Lamp Systems

Trojan Model No.	Number of UV Lamps	Disinfection* Flowrate	TOC Reduction** Flowrate
8002S	2	25 GPM	8 GPM
8004S	4	50 GPM	[illegible]
8006S	6	85 GPM	28 GPM
8008S	8	120 GPM	[illegible]
8008L	8	240 GPM	80 GPM
8012L	12	360 GPM	120 GPM
8016L	16	480 GPM	160 GPM
8024L	24	720 GPM	240 GPM
8032L	32	960 GPM	320 GPM

* Based on a minimum UV transmission of 98% and a UV dose of 30,000 microwatt seconds/square centimetre being delivered at the end of lamp life (8,760 hours).
** Based on a minimum UV transmission of 98% and a UV dose of 90,000 microwatt seconds/square centimetre being delivered at the end of lamp life (8,760 hours).

Patents:

5,006,244	1,163,086	4,482,809	0,008,780B1
4,872,980	1,327,877	2,174,989	0,361,579B1

Other patents pending.

Trojan ... the brightest ideas in UV technology

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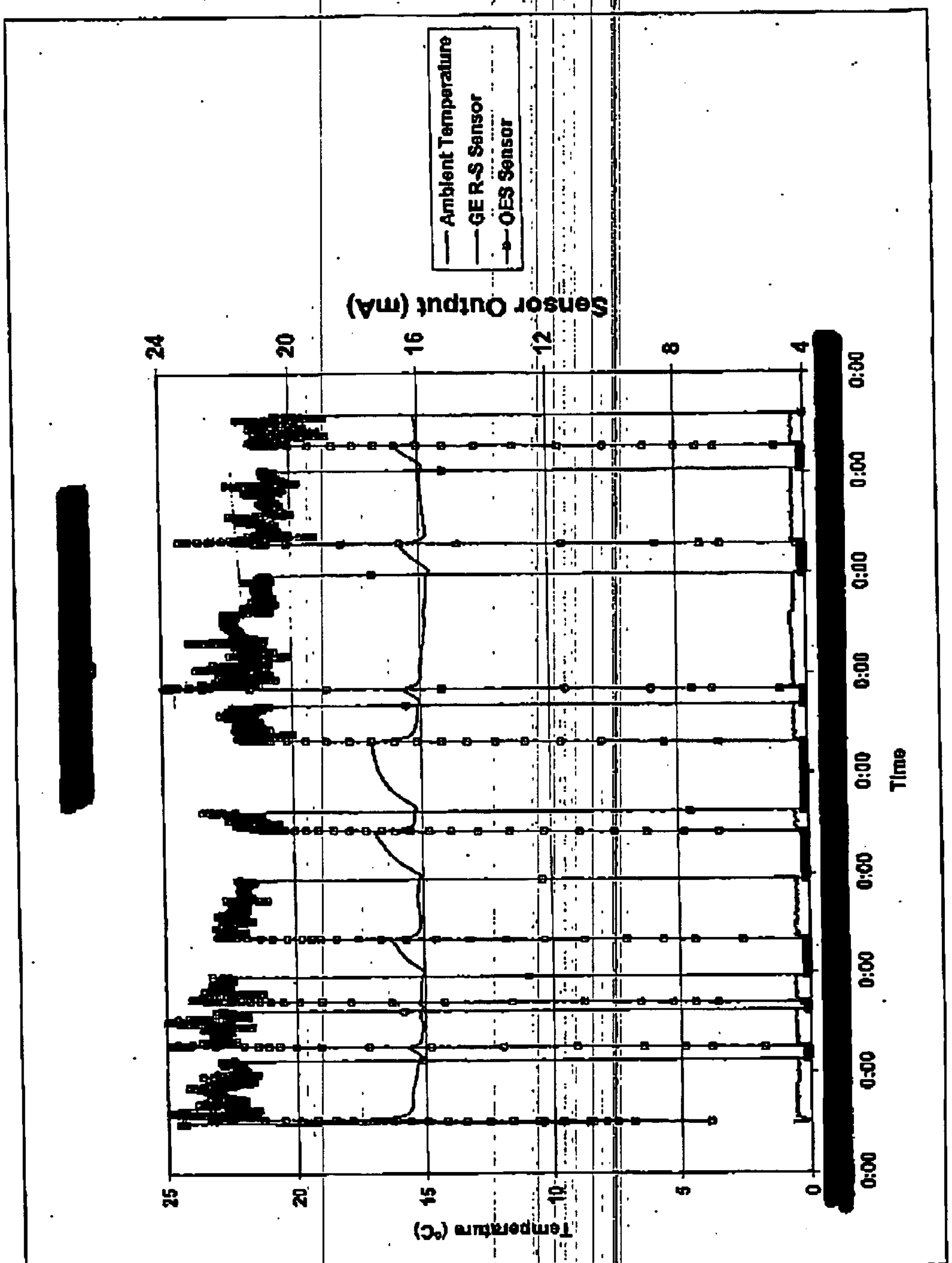
Calibrated Trojan/OES Sensors [redacted]

Number	Type	Water Thickness	Sensor Output	Temperature	Notes	Location
501	L.P.	1.7 cm	?	?	UV 8000	Accurida, London.
502	L.P.	1.0 cm	20.5 mA	32.7 °C	Calibrated on 700/ADV in Lab.	In Lab.
503	L.P.	1.0 cm	19.7 mA	32.9 °C	Calibrated on 700/ADV in Lab.	UV3000 pilot
504	M.P.	11.9 cm	20.7 mA	?	Calibrated on UV 8000 in Lab.	In Lab.
505	L.P.H.O.	1.7 cm	13.1 mA	32.6 °C	Recalibrated on site to 20 mA.	G16, Waterloo.
506	L.P.	1.7 cm	20.4 mA	?	Recalibrated	In Lab.
507	M.P.	11.9 cm	20.2 mA	?	Recalibrated on site to 22 mA.	G4, Waterloo.
508	M.P.	11.9 cm	18.7 mA	?	Calibrated on UV 8000 in Lab.	In Lab.
509	L.P.				Sent back to OES for repair.	In Lab.
510	M.P.	11.9 cm	19.6 mA	?	Sent back to OES for repair.	Pilot Lab.

L.P. Low Pressure
L.P.H.O. Low Pressure High Output
M.P. Medium Pressure

The water thickness is the thickness of the water layer between the lamp and the sensor.
The L.P. sensor 506 has to be recalibrated on an actual 1.7 cm port using a low pressure lamp.
1.7 cm ports were not actually used, 1.0 cm ports were used and the desired output was calculated.

EXHIBIT 6


[redacted]
Ambient Temperature
GE R-S Sensor
OES Sensor
Sensor Output (mA)
Temperature (°C)
Time
[redacted]